OCTOBER 1988

ANALYSIS OF THIRD-PARTY MAINTENANCE

INPUT®

1280 Villa Street, Mountain View, California 94041-1194
(415) 961-3300

Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

Customer Service Program (CSP)

Analysis of Third-Party Maintenance

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FTMA • 164 • 1988

Abstract

The purpose of this report, *Analysis of Third-Party Maintenance*, is to examine the ever-changing requirements for service and support as reported by a sample of current users of third-party maintenance. In addition, the report measures TPM ability to satisfy those service and support needs, not only in traditional hardware maintenance activities, but also in the increasingly important areas of software support and professional services (e.g., planning and consulting services).

The report measures the service and support requirements of 200 current users of third-party maintenance. After examining the entire sample as a whole, the report breaks down the sample into major product types—large system, small system, peripheral product, and microcomputer systems—and analyzes each product type separately. Where possible, the report compares the satisfaction levels of TPM users with satisfaction of users of manufacturer-supplied service.

No analysis of user trends in third-party maintenance would be complete without an examination of what draws users to TPM, and of which support areas represent future growth areas for TPM organizations that wish to expand their service and revenue opportunity areas.

The report consists of 78 pages, including 53 exhibits.

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I

Introduction

I

Introduction

This report, *Analysis of Third-Party Maintenance*, is the first in a series of three reports prepared by INPUT for clients of the 1988 Customer Service Program. This report examines user satisfaction with the service that they received from their third-party maintenance vendor, and contrasts that satisfaction, when appropriate, with manufacturer-supplied service performance. The next report, *Vendor Competitive Analysis—Third-Party Maintenance,* will profile the service operations of leading TPM organizations. The last deliverable in this research module, *Service Market Analysis—Third-Party Maintenance,* will provide an analysis of the past year's major developments in the TPM industry, as well as a current market size estimate and five-year forecast.

A

Scope

The purpose of this report is to examine the ever-changing requirements for service and support as reported by a sample of current users of third-party maintenance. In addition, the report measures TPM ability to satisfy those service and support needs, not only in traditional hardware maintenance activities, but also in the increasingly important areas of software support and professional services (e.g., planning and consulting services).

No analysis of user trends in third-party maintenance would be complete without an examination of what draws users to TPM, and of which support areas represent future growth areas for TPM organizations that wish to expand their service and revenue opportunity areas.

Following this introduction, the report presents in Chapter II an Executive Overview of the main points of the report in a format that facilitates the creation of presentation materials. In Chapter III, the report continues by examining the service satisfaction reported by the TPM user sample as a whole. In this chapter, the report measures TPM performance in a number of support areas, including hardware maintenance, software support, and professional services. Chapters IV through VII break down

the TPM user sample into specific product groups: users of large systems, small systems, peripherals, and microcomputers. In these chapters, user satisfaction with TPM vendor performance is analyzed and, in the case of large- and small-system users' groups, compared to the performance of manufacturer-based service organizations. The report concludes with Appendix A, which contains the questionnaire used for the survey; and Appendix B, which contains a glossary.

B

Methodology

For this report, INPUT surveyed 200 current users of third-party maintenance concerning their requirement for a number of service and support offerings, including hardware maintenance, software support, and professional services (i.e., planning and consulting services). INPUT targeted leading Information Systems (IS) officials at each of these user organizations, and surveyed by telephone using the questionnaire contained in Appendix A. INPUT found that telephone surveying has many benefits over mail surveys, such as knowledge and control over the respondent and the ability to ask follow-up questions.

After the interview process was completed, the information gathered was entered into a dBASE III Plus (Ashton Tate Corporation) data base, run through quality-control tests, and then analyzed using the ABstat statistical analysis package (Anderson-Bell Corporation). During the analysis process, additional quality control was performed to ensure data integrity.

II

Executive Overview

II

Executive Overview

The following chapter contains summary information from the study *Analysis of Third-Party Maintenance,* in a format that provides key findings in a quick and orderly fashion. Each finding is presented in an exhibit with accompanying text.

The third-party maintenance (TPM) market is currently under fire, as manufacturer service organizations, led by industry leader IBM, attempt to slow user defection to TPM (and even win back some past users) by expanding their service offerings while at the same time offering extremely competitive discounting and pricing plans. Now more than ever, computer users find themselves in a "buyers' market," as manufacturers and TPMs try to "out-support" the other with more service for fewer service dollars.

As a result, users are expecting more than lower prices from their TPM. Quality of service now ranks most important to TPM users, who also never lose sight that in a "buyers' market" they can expect to receive attractive prices and quality service.

A

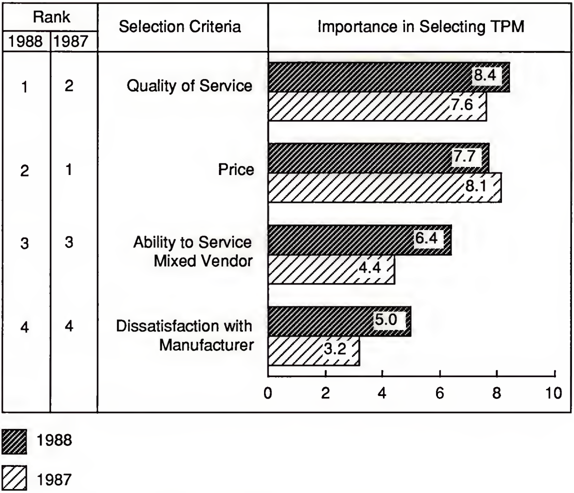
TPM Users Look for Quality As Prices Drop

In what is becoming a clearly visible pattern, third-party maintenance (TPM) users now rate service quality as the most important factor in the selection of a TPM vendor, a shown in Exhibit II-1. Since 1985, INPUT has found that TPM users have alternated between service price and service quality as the most important selection factor (with price ranking highest in 1985 and 1987, and quality ranking highest in 1986 and 1988).

This flip-flopping of selection priorities can be attributed to changes in the manufacturer-TPM competitive environment. In 1985, the TPM market was enjoying unprecedented growth. In efforts to continue that growth, TPMs frequently used discounted prices as their primary drawing factor to win business from manufacturers and each other.

EXHIBIT II-1

TPM SELECTION CRITERIA



By 1986, TPM growth began to slow as the market began to show signs of maturation (i.e., mergers and acquisitions, and industry fallout). As TPMs grew larger, there was less emphasis on lower service prices and more emphasis on service quality (that often resulted from TPMs' newly found size).

In 1987, manufacturers began to step up their efforts to slow user defection to TPMs by offering expansive discount policies (such as IBM's Corporate Service Amendment). TPMs were forced to respond and, as a result, price became the primary selection factor.

Currently, price wars appear to have subsided, and now TPMs seem to be emphasizing service quality again. Examples of this focus include TRW's much-publicized centralization of its dispatching function (via its purchase of the Fieldwatch service management software system) and Intelogic Trace's guaranteed response and repair offerings for IBM 3X products.

B

TPMs Compete Favorably in Providing System Availability

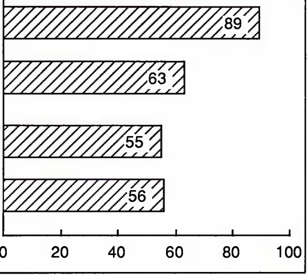
System availability consistently ranks as the most important service concern as expressed by all users of Information Systems, since computer downtime equates to lost revenues in most business situations.

Exhibit II-2 compares large- and small-system users' satisfaction with system availability (taken from the 1988 reports *Analysis of Large Systems Service* and *Analysis of Small Systems Service*) with the respective users of TPM. Presumably, users of TPM would report lower system availability, since TPM users usually use older equipment than manufacturer-based users. However, small-system users of TPM service reported nearly identical requirements for and satisfaction with system availability

EXHIBIT II-2

TPM VERSUS MANUFACTURER SYSTEM AVAILABILITY PERFORMANCE

Product Type	Vendor Type	Require (Percent)	Receive (Percent)	Percent Satisfied
Large System	TPM	97.9	98.7	89
	MFR	98.3	97.9	63
Small System	TPM	96.7	95.0	55
	MFR	96.9	96.1	56



as did their manufacturer-supplied counterparts. More surprisingly, large-system users of TPM reported substantially higher satisfaction with system availability.

Actually, this comparison is not entirely fair, since the large-system TPM sample was almost entirely composed of fairly new IBM 308X mainframes that have proven to be reliable. Still, it is noteworthy that in light of concerns over spares availability, access to proprietary service tools, documentation, and other support technology, TPM service compares favorably to manufacturer-supplied service.

TPM service organizations matched their manufacturer-based competition in such performance areas as response time actuals and user satisfaction levels, and even surpassed repair time actuals as reported by the TPM users of both large- and small-system service. Thus, it is no surprise that TPM users rate service quality most important as a decision factor.

C

TPM Users Report Higher Overall Satisfaction

The TPM user sample not only reported high satisfaction with system availability and vendor response and repair times, but also with most areas of traditional hardware maintenance. Exhibit II-3 compares overall TPM user satisfaction with the hardware maintenance in the large- and small-systems product markets to users' satisfaction with manufacturer-based service. From the exhibit, it is obvious that the TPM samples were equally, if not more satisfied, with the hardware maintenance they received.

This satisfaction was fueled by response and repair times that exceeded their requirements, as well as system availability performance that equaled small-system manufacturer service performance and exceeded large-system manufacturer service performance.

TPM organizations should be expected to try harder, particularly in tailoring the support offering to the user's specific needs, particularly since the 1988 TPM user sample placed greater importance on service quality than on service pricing. One official at a leading TPM, when describing the advantages of independent service providers, stated that TPM companies "live and die" by the service they provide.

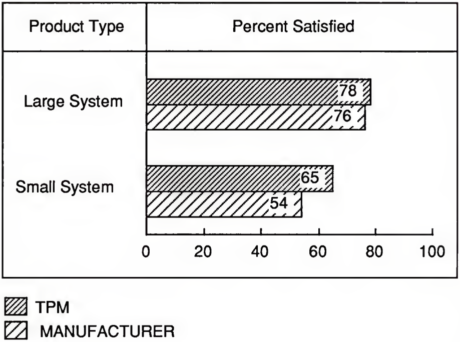
D

TPM Users Voice Concern about Spare Parts

A prime concern of computer users of either third-party maintenance or manufacturer-supplied support is the availability of spare parts. Perhaps users are becoming aware of the difficulty service organizations are having maintaining sufficient levels of spare parts, since spare parts costs have risen dramatically in the past five years.

EXHIBIT II-3

USER SATISFACTION WITH HARDWARE MAINTENANCE TPM VERSUS MANUFACTURER



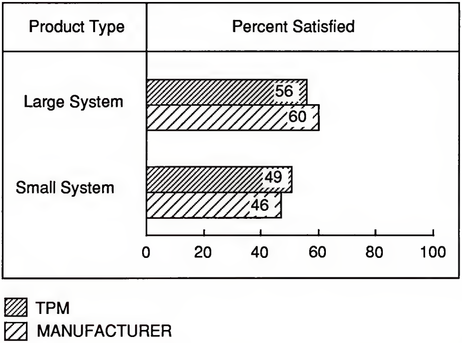
One would expect that users of TPM service would be more dissatisfied with spares availability, given the difficulties TPM vendors are reporting in acquiring spare parts from manufacturers. Recently, a court in Philadelphia ruled against Allen-Myland Incorporated, an upgrade/third-party maintenance company that attempted to prove that IBM unfairly restricted trade by not offering spare parts for 308X mainframes at discounted prices. TPMs watched this case closely, hoping that a favorable decision would force all manufacturers to open up spare sales.

The rising costs of spares are also forcing manufacturer service organizations to improve spares tracking and handling capabilities. Most service organizations recognize the infeasibility of storing large supplies of costly spares at all locations; instead, most now use some form of air freight delivery service.

Users of TPM and manufacturer service both express dissatisfaction with spares availability, as shown in Exhibit II-4. Surprisingly, TPM service organizations did not fare differently than manufacturer-based service organizations (in fact, TPMs satisfied more of their small-system users

EXHIBIT II-4

USER SATISFACTION WITH PARTS AVAILABILITY TPM VERSUS MANUFACTURER



than did manufacturer service organizations). Still, TPMs must continue to strengthen their logistics capabilities or lose ground to manufacturers in this area.

III

User Service Requirements— All TPM Users

III

User Service Requirements—All TPM Users

A

TPM Selection Criteria—All Users

Since 1985, INPUT has attempted to analyze why users of various data processing equipment have selected third-party maintenance sources over the original manufacturer. Except in situations where there is no other service source (such as in the case of Altos workstation users), INPUT has found that most users have selected TPM primarily due to the following two reasons: price and service quality. This situation is not surprising, since all users (of both manufacturer- and TPM-based service) would be most concerned about service quality and price. Exhibit III-1 shows that in 1988, service quality and price continue to rate highest as selection criteria.

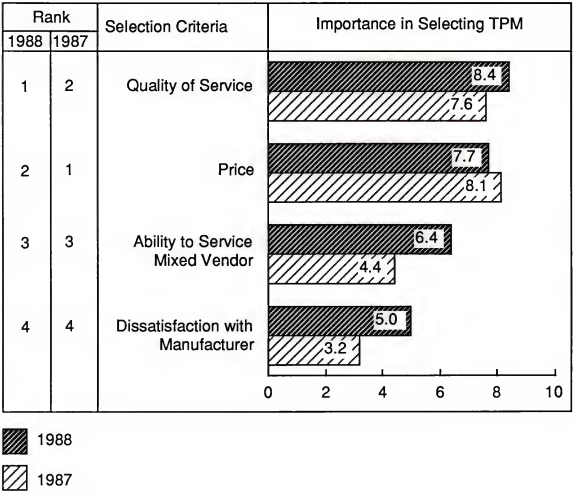
Curiously, these two factors have swapped first and second place in selection importance since 1985 (price ranked highest in 1985 and 1987, whereas service quality ranked highest in 1986 and 1988). This phenomenon can be attributed to the tremendous competition between manufacturers and TPMs for service business. As TPMs continue to expand and improve their service offerings, manufacturers counter with increasingly attractive price discounts.

Back in 1985, the third-party maintenance industry was still in a state of rapid growth. As TPMs competed for more service business with both manufacturers and each other, lower service prices were most often used as the bait for new business. By 1986, the market was already beginning to exhibit slowed growth, as the market began to mature and TPMs began to rely heavily on acquisitions as the primary growth tool. As the TPMs grew larger and more mature, less emphasis was placed on pricing as a sales edge, and more weight was placed on growing service capabilities.

In 1987, industry leader IBM attempted to slow the defection of users to TPM, and perhaps draw back users in the process, by announcing sweeping service discounts in the form of the Corporate Service Amendment

EXHIBIT III-1

TPM SELECTION CRITERIA
ALL USERS



(the CSA was actually announced in late 1986, but did not show its full effects until 1987) and Mid-Range System Amendment. IBM later expanded its service coverage to 24-hour, 7-day per week for all system service, which in effect further reduced the "price/performance" ratio for IBM service versus TPMs.

Most TPMs were forced to counter with similar discount plans and further price reductions to remain competitive. As a result, TPM users reported in 1987 that service price had become the most important factor in the selection of a service vendor; the importance of price is not sur-

prising due to the magnified focus on service pricing as competition heated up between manufacturers and TPM.

Although service pricing continues to be an important factor in 1988, users have again selected service quality as the most important selection factor. This emphasis on quality is reflected in the increased focus placed on issues of service quality, typified by guaranteed response and repair time offerings announced in 1988 by Intelogic Trace; and in TRW's efforts to centralize dispatching capabilities (which should improve responsiveness). Manufacturers also focused on improving service performance in 1988: IBM increased automated support on its new AS/400 small system, HP opened a new customer support center in Atlanta, and DEC expanded its software support offerings, to name just a few examples.

From 1986 to the present, a TPM's ability to provide service on mixed-vendor computer sites became less and less important as a reason for selecting a TPM over manufacturers. The primary reason was a greater involvement by most manufacturers in servicing products they did not manufacture. Some manufacturers started their own third-party organizations (CDC, Honeywell, and Sperry, to name a few), while others simply began servicing peripherals commonly found at their system users' sites.

The best example of this latter group was DEC, which historically encouraged the growth of TPMs by allowing resellers to include non-DEC peripherals in systems if the inclusion made the entire system more price-competitive. At first, DEC supported only the DEC processors and peripheral products at mixed sites, creating a demand for TPM. Later, DEC announced DEC-Compatible service, thereby offering service on a long list of peripherals found at system sites (during this time, DEC refused to call its service third-party maintenance, resulting in a famous headline that played with the line "If it walks like a duck...").

In early 1986, IBM rather tentatively first stepped into providing support on non-IBM products by announcing service on a short list of peripheral and board products commonly found on IBM Personal Computers. Then in August of 1988, IBM dramatically upped its involvement in supporting non-IBM products that may be present at IBM large- and small-system sites by announcing its Technical Systems Management series of support offerings. Differing from the tack taken by DEC (with DEC-Compatible), TSM places IBM in the role of site manager, whereby IBM is responsible for identifying problems; contacting the appropriate service vendor; and, for customers who opt for the Service Management option, acting as a service subcontractor and arranging with others to perform the service. In any case, TSM represents IBM's most significant effort at providing single-source support.

As with any service-related business, computer maintenance organizations must expect that a small percentage of their customers are going to be unhappy with some or even all aspects of the service provided. Some manufacturers may even secretly prefer to lose these "impossible to please" customers to TPMs. Yet for the last two years, dissatisfaction with the manufacturer has ranked last as a selection criterion, suggesting that few users defect to TPMs as a result of dissatisfaction with their manufacturer-supplied service.

B

TPM Contractual Coverage—All Users

Exhibit III-2 presents an analysis of the entire TPM user sample's contractual service coverage, broken down by days and hours covered. From the exhibit, it is readily apparent that most TPM users still contract for single-shift (Monday through Friday, 8 AM to 5 PM) coverage. Since this is the first year that INPUT has analyzed the contract coverage of TPM users, it is not possible to discuss whether TPM users' coverage has increased as have manufacturer-supplied service users.

EXHIBIT III-2

TPM CONTRACT COVERAGE ALL USERS

Service Coverage	Sample (Percent)
Days of Coverage	
Monday – Friday	71
Monday – Saturday	4
Monday – Sunday	25
Hours of Coverage	
1–9 Hours	62
10–16 Hours	9
17–24 Hours	29

One possible explanation for the predominance of single-shift coverage may be that TPM users are more price-sensitive, thus are less likely to opt for more-expensive extended service coverages.

Another explanation stems from the predominance of smaller (personal computers, peripherals, and older minicomputers) and older equipment serviced by TPMs. TPM penetration into the mainframe and supermini-computer markets (two markets where users are more likely to contract for multishift service coverage) is significantly less than other product markets.

Few TPMs followed IBM's lead in extending the basic service coverage of its system users to around-the-clock. In both the large- and small-system (manufacturer-based) markets, IBM's announcement increased the percentage of users reporting multiple-shift coverage significantly. It will be interesting to see whether TPM users' experience with two- and three-shift coverage increases.

C

TPM Service Performance Analysis

Before analyzing the actual effectiveness of TPM service performance versus their own user requirements and (in the case of large- and small-system users) the performance of manufacturer-based service vendors, it is necessary to examine the frequency and cause of the problems reported by users. Exhibit III-3 presents the average number of system interruptions reported by the overall TPM user sample, as well as a breakdown of what caused the system interruption.

EXHIBIT III-3

TPM SYSTEM INTERRUPTION ANALYSIS
ALL USERS

System Interruptions (per Month)	2.0
	Percent
Hardware Caused	57
System Software Caused	14
Applications Software Caused	8
Other (i.e., User Caused)	21

Since TPMs usually service equipment that, due to age or product type, does not benefit from improved technology (remote support, fault-tolerance, etc.), it is reasonable to expect that TPM users would report greater susceptibility to system interruptions. In later chapters (which compare TPM performance to manufacturer-based service performance in the large- and small-system markets), TPM users did indeed report more system interruptions; however, users reported only slightly more system interruptions than did their manufacturer-based counterparts.

More importantly, TPM users report high overall satisfaction with such key performance criteria as system availability, response time, and repair time. Exhibit III-4 demonstrates that almost six out of ten TPM users receive satisfactory levels of system availability, and eight out of ten users were satisfied with the response and repair times that their TPM vendors averaged.

EXHIBIT III-4

TPM SYSTEM AVAILABILITY ANALYSIS
ALL USERS

Component	Require	Receive	Percent Satisfied
System Availability (Percent)	96.9	96.0	59
Response Time (Hrs)	4.9	5.2	80
Repair Time (Hrs)	6.0	5.9	83

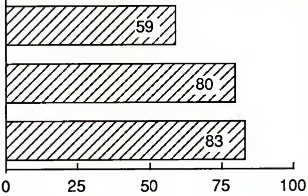
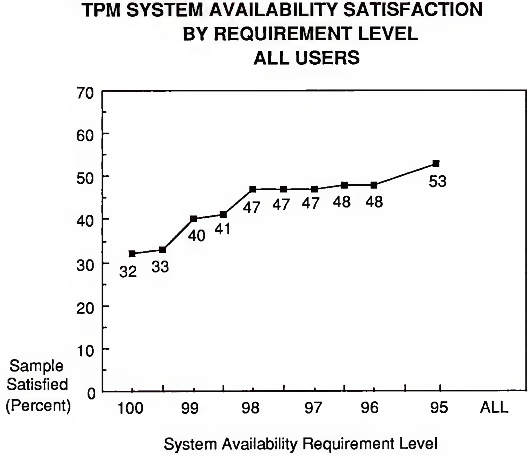


Exhibit III-5 further demonstrates that TPM vendor performance to satisfy user requirement for system availability falls off gradually up to the 98% system availability requirement level, above which vendor performance falls off more quickly.

EXHIBIT III-5

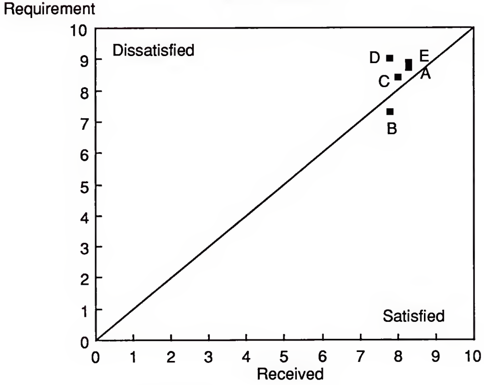


The term *third-party maintenance* emphasizes the importance of vendor performance in traditional hardware maintenance activities (some TPMs that have expanded their service offerings into such nontraditional areas as software support and professional services are attempting to refer to themselves as third-party support vendors). Exhibits III-6 and III-7 analyze TPM performance in hardware maintenance activities versus TPM user requirements.

Users place greatest importance on spare parts availability, in recognition of the importance of having the necessary part in maintaining optimum system availability. Although this concern is present among all users of data processing equipment, it is especially true among users of third-party maintenance, since TPMs have to purchase spare parts from the very manufacturers that the TPMs compete with for service business.

EXHIBIT III-6

TPM HARDWARE MAINTENANCE
REQUIRED VS. RECEIVED
ALL USERS



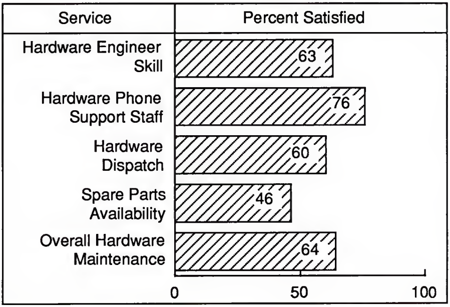
A. Hardware Engineer Skill
B. Hardware Phone Support Staff
C. Hardware Dispatch
D. Spare Parts Availability
E. Overall Hardware Maintenance

It is no surprise that with such high expectations, fewer than half of the 1988 TPM sample reported satisfaction with their TPM vendor in the area of spares availability. Unfortunately, this performance represents a significant drop in satisfaction from last year's sample, when 60% of the TPM respondents reported that they were satisfied.

Rising costs of individual spare parts have made parts tracking, inventory control, and delivery become critical functions of all service organiza-

EXHIBIT III-7

TPM HARDWARE MAINTENANCE SATISFACTION ALL USERS



tions. Manufacturer-based service organizations can benefit from advanced products that have remote diagnostics and even artificial-intelligence-based tools that aid in problem diagnosis and parts identification, often before the field engineer is even dispatched to the site. Since TPMs most often service older equipment that does not feature such tools, TPM engineers must rely on more-traditional tools and procedures. And when a TPM does service a product that features remote support technology, the manufacturer-designed tool is often unavailable to the TPM (as a proprietary tool); thus the TPM is required to reverse-engineer the tool, purchase from another source (i.e., TRW sells diagnostic software for DEC products), or do without.

A last issue concerning spare parts is the constant battle between TPMs and manufacturers regarding the sale of spares in a timely and affordable fashion. TPMs have frequently attempted to use the courts in their attempts to secure a constant flow of spares, often with little or no success (the most recent was Allen Myland, Inc. versus IBM). In 1988, IBM reduced the number of spare parts centers from which TPMs could access spare parts and at the same time raised the charge for emergency spare part orders. Even though IBM stated that these efforts were instituted to assure that individual spare parts centers would have required spares (by increasing the centralization of needed spares), many in the TPM industry viewed this move as a way IBM could limit spares availability to TPMs while still acting within the bounds of the 1956 Consent Decree.

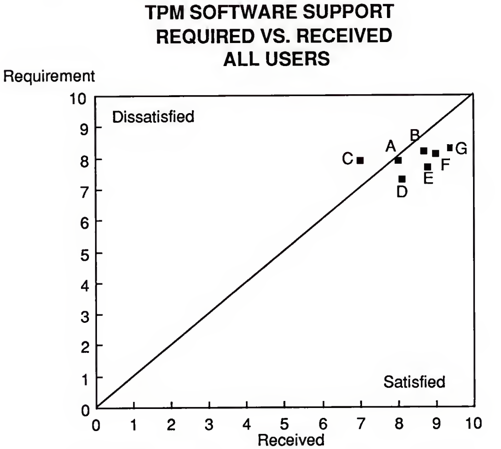
All of these issues are not lost upon the user community, which frequently must request, purchase, and store parts for TPMs to have constant access to these parts. Still, user acceptance of any spare parts problems is sufficiently high to maintain relatively high satisfaction marks with other areas of hardware maintenance.

Although TPM organizations have traditionally emphasized hardware maintenance activities, a few leading-edge TPMs have expanded the breadth of service offerings to include software support. Sixteen percent of the 1988 TPM user sample reported that it received software support from a TPM vendor (paying 16.7% premiums for this support). Compared to typical software support provided by product manufacturers and software vendors (which is usually supplied in the form of telephone support), software support from TPMs appears to be fairly evenly split between on-site support and telephone support.

Exhibits III-8 and III-9 present TPM user satisfaction with whatever software support they received. From the exhibit, it is apparent that TPM performance in the area of software support is pretty much a mixed bag. TPM users appear fairly satisfied with the telephone and on-site support they received from their TPM, but appear less satisfied with the engineers' skill levels, and the overall level of support received. Since engineers with TPMs are usually hardware-oriented, it is understandable that user satisfaction might be low in this area. On the other hand, user dissatisfaction with overall support may be as much a reflection of dissatisfaction with the reliability of the software (with 56% of the sample dissatisfied) as with the support itself.

If this is true, the TPM is left in the unenviable position of having to be judged for something (product reliability) completely out of its control. Thus, it is understandable why few TPMs have attempted to expand their software support offerings.

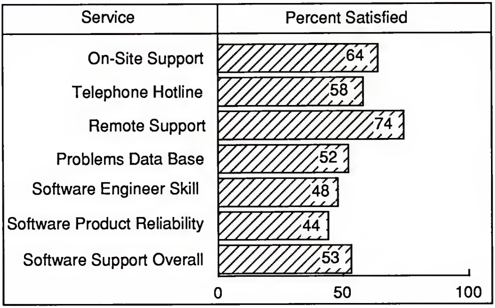
EXHIBIT III-8



A. On-Site Support
B. Telephone Hotline
C. Remote Support
D. Problems Data Base
E. Software Engineer Skill
F. Software Product Reliability
G. Software Support Overall

EXHIBIT III-9

TPM SOFTWARE SUPPORT SATISFACTION
ALL USERS

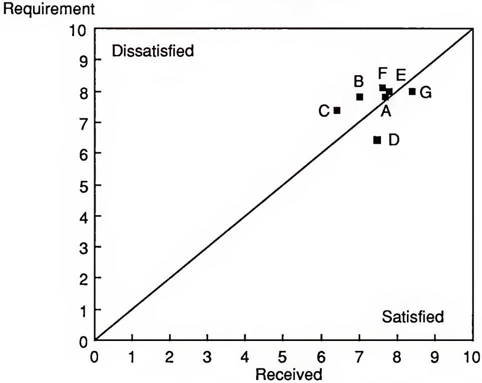


A greater percentage of the 1988 TPM respondent base (23%) reported that it has received some form of professional service from a TPM vendor. Most often, the users received some form of planning (either installation, needs assessment, or capacity planning) or product upgrade. Exhibits III-10 and III-11 analyze TPM user experience and satisfaction with the professional services they received from vendors. Although user satisfaction with these increasingly important service areas is high, it is perhaps a little disturbing that user satisfaction is lowest in the area that TPM users have the greatest experience with (overall planning services and product upgrades).

Still, most TPMs see professional services as a necessary growth area for the following reasons: user price sensitivity for these services is much lower than for hardware maintenance, users are increasingly attracted to these services due to the positive effect on system performance, and most of these planning and consulting services represent an additional source of add-on revenues.

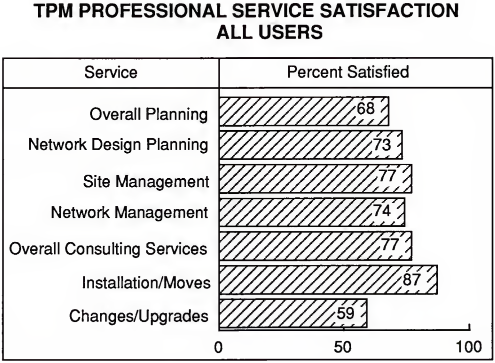
EXHIBIT III-10

TPM PROFESSIONAL SERVICE REQUIRED VS. RECEIVED ALL USERS



A. Overall Planning Services
B. Network Design Planning
C. Site Management
D. Network Management
E. Overall Consulting Services
F. Installation/Moves
G. Changes/Upgrades

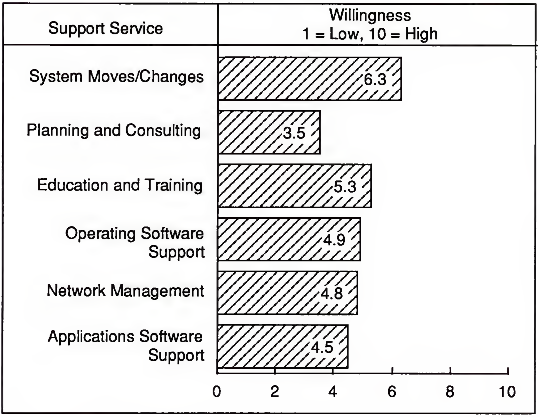
EXHIBIT III-11



Still, it is apparent that most users (even current users of TPM) still view TPM vendors as hardware maintenance specialists. Exhibit III-12 indicates that the current sample of TPM users demonstrates relatively little willingness to expand its TPM support in many nonhardware maintenance areas. Perhaps most disheartening is the unwillingness that the 1988 TPM user sample expressed in the area of network management, an area of great opportunity since few vendors of any kind currently excel in this area. Even though many TPM organizations have expressed a desire to grow into the telecommunications support arena, it is apparent that they will need to overcome user perceptions regarding a lack of expertise in that area.

EXHIBIT III-12

CURRENT TPM USER WILLINGNESS TO EXPAND COVERAGE ALL USERS



Lastly, Exhibit III-13 suggests that even in light of the tremendous price competition between TPMs and manufacturers (best typified by IBM's CSA and MRSA offerings), relatively few TPM users report that they currently receive a discount for service. When they did receive a discount, most often it was for some reduced level of service. It is dangerous to rely on discounts for attracting and maintaining service customers, particularly by offering reduced service for reduced price. Since users place paramount importance on service quality, users who perceive a drop in support (even for a discount) will soon look for alternative sources.

EXHIBIT III-13

TPM USER EXPERIENCE WITH DISCOUNTS
ALL USERS

Discount	Sample (Percent)
Reduced Service Coverage	14
Scheduled Maintenance	9
Other*	14

* Quantity: 8 Mentions
Education: 3 Mentions
Negotiated: 2 Mentions

IV

TPM User Service Requirements—Large Systems

IV

TPM User Service Requirements—Large Systems

A

TPM Selection Criteria—Large-System Users

In 1988, INPUT surveyed nine users of large systems who used third-party maintenance. Historically, usage of TPM by large-system users has been extremely limited, due to a number of factors:

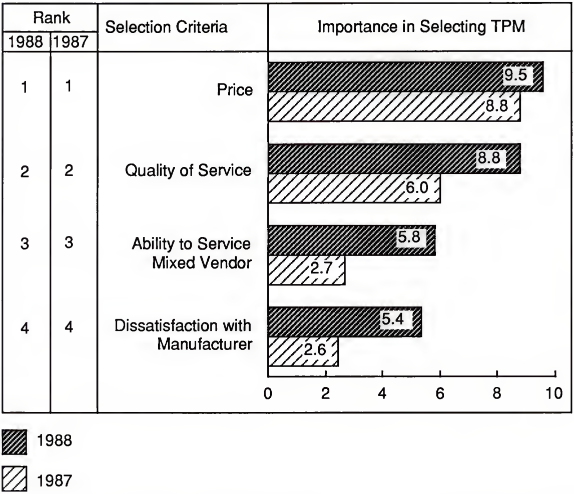
- Large-system users have higher service and support requirements, particularly in those nonhardware maintenance support areas where TPMs are least active. In addition, large systems' greater requirement for service increases user concern over spare parts availability and access to remote support tools.
- Large-system users are typically less price sensitive with regard to service than are other system and peripheral users, making it difficult for TPMs to draw a significant share of the large-system users on price alone.

Because of these reasons discussed above, INPUT has forecasted slowed growth of TPM penetration in the large-system market. Consequently, it is not surprising that the number of large-system respondents has declined the last three years, even though the total sample size has remained constant.

Exhibit IV-1 indicates that the few users of large systems surveyed did base their decision on service price, rating price a 9.5 on a scale of 10 (with 10 being most important). Quality of service followed closely behind (at 8.8), and the other two factors were rated well behind.

EXHIBIT IV-1

TPM SELECTION CRITERIA
LARGE-SYSTEM USERS



B

TPM Contractual Coverage—Large-System Users

In the large-system market, the major competitors are IBM, Amdahl, and NAS. All three of these vendors offer service 24 hours, 7 days per week as their standard coverage (although NAS offers a 5-day, 11-hour reduced coverage option). Thus, it is not surprising that the majority of the TPM sample of large-system users also reports, as shown in Exhibit IV-2, that they receive "around-the-clock" coverage, particularly since the sample is predominantly newer IBM mainframes (308Xs).

EXHIBIT IV-2

TPM CONTRACT COVERAGE LARGE-SYSTEM USERS

Service Coverage	Sample (Percent)
Days of Coverage	
Monday – Friday	33
Monday – Saturday	11
Monday – Sunday	56
Hours of Coverage	
1–9 Hours	33
10–16 Hours	11
17–24 Hours	56

The TPM large-system sample actually reported greater coverage than the manufacturer-based large-system sample (examined in *Analysis of Large Systems Service*). Fifty-two percent of the manufacturer-based sample reported that they were covered Monday through Friday, and 55% of that sample reported that they were covered from 17 to 24 hours. However, the manufacturer-based sample also covered mainframes from Unisys, NCR, Honeywell, and CDC, all of which do not provide around-the-clock coverage as their standard offering.

C

TPM Vendor Performance Analysis—Large-System Users

Exhibit IV-3 presents a breakdown of the large-system TPM user sample system interruptions. The TPM large-system sample reported 1.7 system interruptions per month, which was just slightly higher than the manufacturer-based large-system sample's average of 1.6 per month. The TPMs reported that a greater percentage of their system interruptions were caused by hardware and other (usually user or environment) related problems, whereas the manufacturer-based sample attributed a larger percentage to systems and applications software (21% and 11% of all system interruptions).

EXHIBIT IV-3

TPM SYSTEM INTERRUPTION ANALYSIS LARGE-SYSTEM USERS

System Interruptions (per Month)	1.7
	Percent
Hardware Caused	54
System Software Caused	14
Applications Software Caused	6
Other (i.e., User Caused)	26

This sample of large-system TPM users reported extremely high satisfaction with the system availability they received from their service vendor. According to Exhibit IV-4, TPM vendors were able to satisfy 89% of their large-system users by providing 98.7% system availability (versus a user requirement of 97.9% system availability). This performance compares very favorably to the manufacturer-based sample, which reported that they received 97.9% system availability (versus a requirement level of 98.3%), which satisfied 62% of the sample. Of course, it must be reported that the TPM sample was predominantly IBM 308X mainframes, where the manufacturer-based sample contained products from a wide range of manufacturers, some of whom were less reliable.

The improved system availability (and satisfaction) can be attributed to faster response and repair times reported by the TPM large-system users (1.4 hours and 1.9 hours) than the manufacturer-based sample (which reported an average response time of 1.7 hours and repair time of 4.2 hours). Even though both sources of service satisfied nine out of ten of their users in these two performance areas, repair times reported by the overall manufacturer large-system user sample was heavily influenced by a small group of respondents who reported slower repair times. A more accurate comparison of TPM vendor performance versus manufacturer performance would be TPM response time (1.4 hours) and repair time (1.7 hours) versus IBM 308X response time (1.3 hours) and repair time (2.3 hours) since the majority of the TPM large-system sample was 308X users.

EXHIBIT IV-4

TPM SYSTEM AVAILABILITY ANALYSIS
LARGE-SYSTEM USERS

Component	Require	Receive	Percent Satisfied
System Availability (Percent)	97.9	98.7	89
Response Time (Hrs)	1.5	1.4	88
Repair Time (Hrs)	2.4	1.9	88

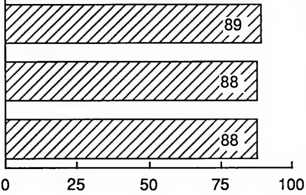
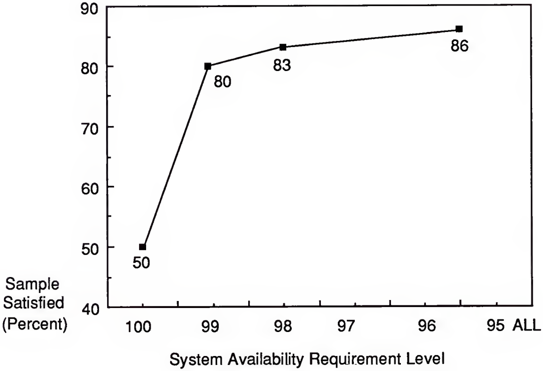


Exhibit IV-5 substantiates large-system (TPM) user satisfaction with system availability and demonstrates that vendor performance stays quite high until user requirements exceed the 99% system availability requirement level.

EXHIBIT IV-5

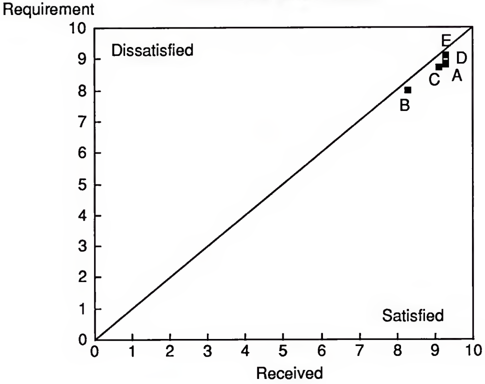
TPM SYSTEM AVAILABILITY SATISFACTION BY REQUIREMENT LEVEL LARGE-SYSTEM USERS



TPM user satisfaction with the hardware maintenance that they received on their large systems is also quite high in many of the areas examined in Exhibits IV-6 and IV-7. Large-system users of TPM service expressed extremely high satisfaction (78% of the sample satisfied) with the overall hardware maintenance that they received from their TPM, yet considerably less satisfaction with other key components of hardware maintenance. For example, users expressed high requirements for field engineer skill level and spare parts availability, yet only 56% of the sample was satisfied with the performance that they received from their TPM in these areas. TPM user concern about spare availability is to be expected, given the high system availability requirements of large-system users (it should be noted that the manufacturer-based sample was not significantly more satisfied with parts availability, with only 60% satisfied). TPM vendors should be concerned with TPM user satisfaction with field engineer skill level, particularly since manufacturer-based large-system service vendors satisfied 81% of their users in this area.

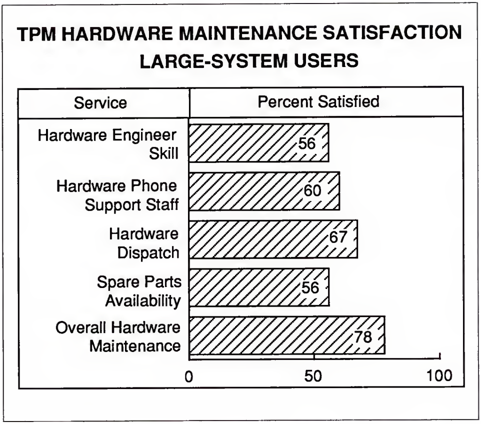
EXHIBIT IV-6

TPM HARDWARE MAINTENANCE REQUIRED VS. RECEIVED LARGE-SYSTEM USERS



A. Hardware Engineer Skill
B. Hardware Phone Support Staff
C. Hardware Dispatch
D. Spare Parts Availability
E. Overall Hardware Maintenance

EXHIBIT IV-7



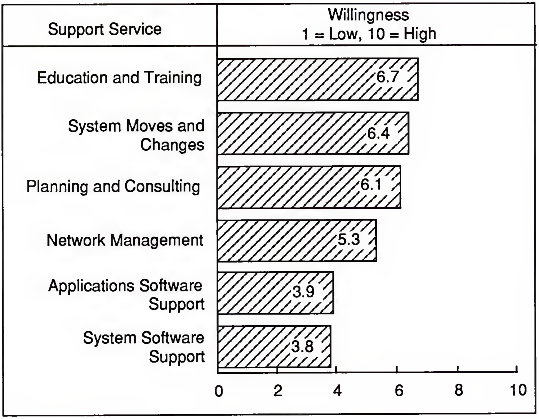
In nontraditional TPM areas of support, the large-system sample expressed greatest attraction to educational and training service areas as new services desired from their TPM, as shown in Exhibit IV-8. Of course, the term "greatest" is a relative term, since TPM users rated their willingness to use TPM for educational and training service a 6.7 (on a scale of 10), suggesting that there really is not much interest in this service from a TPM.

Particularly discouraging to TPMs that have identified software support as a future growth area is the extremely low willingness for large-system users to use their TPM for either system or application software support. Apparently most users do not identify software support as a service that TPMs can supply, since TPMs had previously marketed themselves as hardware maintenance specialists.

Unfortunately, TPMs who cannot expand their services will find it increasingly difficult to compete with manufacturers, as manufacturers (especially large-system manufacturers) continue to reduce hardware maintenance prices, expecting to make up lost revenues in other areas, such as product sales, parts sales, and professional services.

EXHIBIT IV-8

CURRENT TPM USER WILLINGNESS TO EXPAND COVERAGE LARGE-SYSTEM USERS



In light of the significance of IBM's Corporate Service Amendment (announced in late 1986), it is surprising that only 11% of the large-system TPM users reported that they received discounts, as shown in Exhibit IV-9. Most of the leading TPMs that offer service on large systems (e.g., TRW, Sorbus, and CDC) offered CSA-like discount programs of their own.

EXHIBIT IV-9

TPM USER EXPERIENCE WITH DISCOUNTS
LARGE-SYSTEM USERS

Discount	Sample (Percent)
Reduced Service Coverage	11
Scheduled Maintenance	11
Other	11

V

TPM User Service Requirements—Small Systems

V

TPM User Service Requirements—Small Systems

A

TPM Selection Criteria—Small-System Users

The small-system service market has become highly competitive between manufacturers and third-party maintenance organizations, in part due to the steadily increasing product sales in this marketplace, as well as increasing support requirements reported by small-system users, requirements that are approaching those of their large-system counterparts. These growing support requirements have created substantial opportunities for service growth, as has the increased use of automated support technology (e.g., fault tolerance, remote support, and expert systems-based diagnostic tools) in small systems that help reduce the need for costly on-site remedial support visits and allow service of a more predictive nature to be performed.

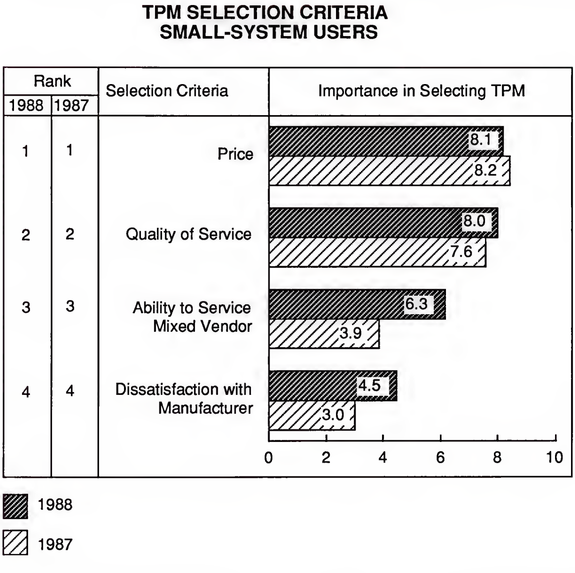
Accordingly, small-system users in the TPM sample continues to be one of the largest segments, with 112 respondents (or 56% of the sample) in 1988.

The increased competition for small-system service appears to be centered on newer products from the two leading players in the market, IBM and Digital Equipment Corporation. Greatest TPM competition in the IBM environment is centered around the System 3X line (mostly the System 36 products), although interest in the newer 9370 and AS/400 minicomputer families is growing. While most major TPMs have attracted the IBM minicomputer families, the most significant effort appears to have been made by Intelogic Trace, which, to much fanfare, has announced guaranteed response and repair time clauses in its service offerings.

Even more interest is being focused on the popular DEC VAX products, especially the newer VAX 8XXX line of small systems. CDC was the first of the major TPMs to offer service on the VAX 8XXX family, but Sorbus, Unisys, and McDonnel Douglas have also recently offered competitive service on the DEC line.

With all of the attention being paid to the small-system market by TPMs, it is not surprising that small-system users find themselves in the comfortable position of being able to expect low prices and quality service from the source of service they select. Exhibit V-1 indicates that small-system users weigh price and quality equally when choosing TPM versus manufacturer-based service.

EXHIBIT V-1



Small-system users' data centers are more likely to be composed of equipment from a wide range of equipment manufacturers than are the data centers of large systems. The increased price sensitivity of small-system users (versus large-system users) often required users to look at third-party suppliers of peripheral products. Historically, DEC allowed resellers to package non-DEC peripherals in DEC systems if the non-DEC peripherals made the system more price-competitive; HP users successfully sued HP to allow users to use non-HP peripherals on HP systems by proving the better price/performance of the non-HP peripherals (at the time, HP would not service any site that had non-HP peripherals).

The mixed-vendor nature of small-system sites helps create a natural market for TPMs; Exhibit V-1 indicates that the ability to service continues to be a factor in deciding on TPM. This factor should decline in importance as a selection criterion, however, since most major small systems offer some level of "foreign" peripheral support, the earliest being DEC (with its DEC-Compatible Service) and most recently IBM, Data General, and HP.

B

TPM Contractual Coverage—Small-System Users

The last time that INPUT analyzed small-system TPM users' contractual coverage (*1986 Third-Party Maintenance User Service Requirements*), the vast majority of the respondents reported that they received service coverage Monday through Friday, nine hours a day (8 AM to 5 PM). Exhibit V-2 indicates that almost one-third of the 1988 small-system TPM sample receives 24-hour, 7-day coverage. The proportion of TPM users of small systems that receive extended service coverage closely approximates the manufacturer-based small-system sample.

Of course, between 1986 and the present time, IBM announced that small-system (and large-system) users would receive around-the-clock coverage, reflecting the increased requirement for increased system availability and support expressed by small-system users who were using their systems for increasing complex and critical applications. INPUT expects that the percentage of users who receive extended service coverage will continue to rise, both in the manufacturer-supplied and TPM service environments.

EXHIBIT V-2

TPM CONTRACT COVERAGE SMALL-SYSTEM USERS

Service Coverage	Sample (Percent)
Days of Coverage	
Monday – Friday	68
Monday – Saturday	6
Monday – Sunday	26
Hours of Coverage	
1–9 Hours	55
10–16 Hours	14
17–24 Hours	31

C

TPM Vendor Performance Analysis— Small-System Users

Small-system users of third-party maintenance reported, as shown in Exhibit V-3, that they incurred 1.5 system interruptions per month, which is slightly higher than the manufacturer-based small systems' users response of 1.2 per month. This difference is fairly small, particularly when the standard error of the mean (0.2) is taken into account. Still, the difference hints at the age difference between the products supported by manufacturers and by TPMs: TPMs typically service slightly older products that have less remote support and are less reliable overall.

The mix of system interruptions of the TPM sample was weighted more toward hardware-related problems than the manufacturer-based small-system sample. This weighting again reflects the age difference between the products serviced, with the manufacturers servicing newer systems with more reliable hardware than the systems serviced by TPMs.

EXHIBIT V-3

TPM SYSTEM INTERRUPTION ANALYSIS
SMALL-SYSTEM USERS

System Interruptions (per Month)	1.5
	Percent
Hardware Caused	65
System Software Caused	9
Applications Software Caused	11
Other (i.e., User Caused)	15

Exhibit V-4 indicates that the two samples vary little in the system availability required by users of third-party maintenance and their manufacturer-based counterparts (who required 96.9% and received 96.1% system availability in 1988). Accordingly, both groups of users were equally satisfied with the system availability they received (55% of the TPM users were satisfied, versus 56% of the manufacturer-supplied service users). Exhibit V-5 further illustrates TPM vendor performance with regard to system availability, indicating that vendor effectiveness at meeting user requirements for system availability drops above the 98% requirement level.

These satisfaction levels are considerably below those reported by large-system users, reflecting how small-system requirements and overall support have risen faster than vendors have been able to provide them. INPUT expects that small-system user requirements for system availability will continue to rise, placing greater burdens on service vendors to improve product reliability as well as improve service performance. To this end manufacturers have a distinct advantage, since they have access to remote support tools and technology that is being increasingly incorporated into the systems.

EXHIBIT V-4

TPM SYSTEM AVAILABILITY ANALYSIS
SMALL-SYSTEM USERS

Component	Require	Receive	Percent Satisfied
System Availability (Percent)	96.7	95.8	55
Response Time (Hrs)	4.2	4.1	83
Repair Time (Hrs)	5.2	5.3	81

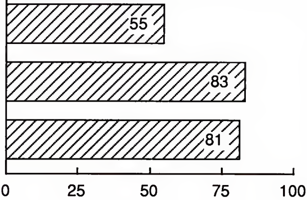
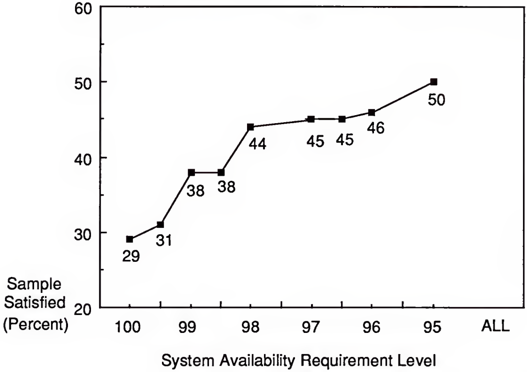


EXHIBIT V-5

TPM SYSTEM AVAILABILITY SATISFACTION BY REQUIREMENT LEVEL SMALL-SYSTEM USERS

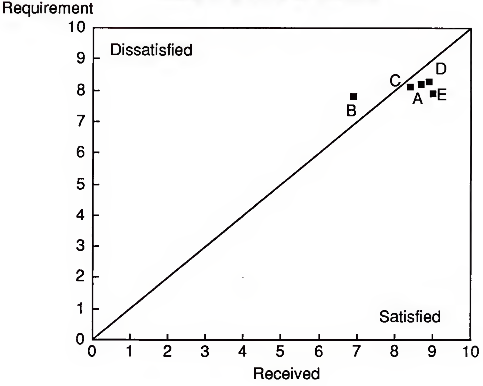


Exhibits V-6 and V-7 show that the TPM user sample's responses regarding user satisfaction with the hardware maintenance that they received (versus their requirements for service) were also extremely close to the responses reported by the manufacturer-based sample, particularly in the key areas of hardware engineer skill level (both sources of support satisfied 60% of their users), and dispatching (manufacturers satisfied 63%, TPMs 61%).

Surprisingly, TPMs were more successful at satisfying their users in the area of spare parts availability than were the manufacturers (49% of the TPM users were satisfied, versus only 46% of the manufacturers' users). Perhaps users of both TPM and manufacturer-supplied service are recognizing the difficulty that service organizations are having in economically maintaining sufficient levels of increasingly expensive spare parts.

EXHIBIT V-6

TPM HARDWARE MAINTENANCE REQUIRED VS. RECEIVED SMALL-SYSTEM USERS

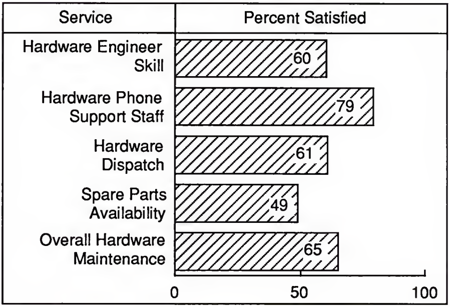


A. Hardware Engineer Skill
B. Hardware Phone Support Staff
C. Hardware Dispatch
D. Spare Parts Availability
E. Overall Hardware Maintenance

Like their large-system TPM user counterparts, the small-system TPM users reported greater overall satisfaction with hardware maintenance than did the manufacturers' users. This difference may be inconsequential, since it is unlikely that TPM users will give their TPM vendors too low a mark, for fear of opening up the question of why they changed service vendors in the first place.

EXHIBIT V-7

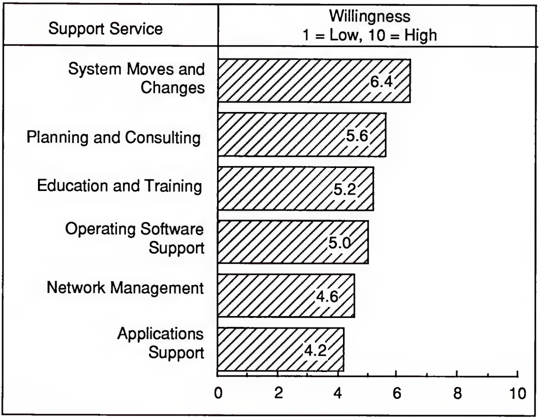
TPM HARDWARE MAINTENANCE SATISFACTION SMALL-SYSTEM USERS



The small-system users also did not report significant willingness to use their TPM in service areas outside of traditional hardware maintenance. Exhibit V-8 reports that small-system users demonstrate some interest in having their TPM perform system moves and changes (services that are hardware-related), but little else. Most interesting is the lack of enthusiasm reported by small-system users regarding network management, a support area of great interest to many TPMs that specialize in the small-system market. This lack of enthusiasm may reflect small-system users' frustration in finding any source of network support, an area where most users resign themselves to perform the support network themselves.

EXHIBIT V-8

CURRENT TPM USER WILLINGNESS TO EXPAND COVERAGE SMALL-SYSTEM USERS



After IBM announced its Corporate Service Amendment that offered significant discounts to large-system users for taking over some of the responsibility for service themselves, IBM announced in 1987 the equivalent discount plan, the Mid-Range Systems Amendment, for users of small-systems. According to Exhibit V-9, 16% of the TPM small-system user sample reported that they received similar service discounts in return for reduced service in 1988. These discounts might be more effective with small-system users than large-system users, since small-system users are usually more price-sensitive regarding service and support. On the other hand, vendors that rely on such plans may be placing themselves in danger of losing customers who perceive a decline

in service (and system) performance, particularly as small-system users' requirements for system availability and service performance continue to rise.

EXHIBIT V-9

TPM USER EXPERIENCE WITH DISCOUNTS SMALL-SYSTEM USERS

Discount	Sample (Percent)
Reduced Service Coverage	16
Scheduled Maintenance	13
Other	16

VI

TPM User Service Requirements—Peripherals

VI

TPM User Service Requirements—Peripherals

A

TPM Selection Criteria—Peripheral Users

In 1988, INPUT surveyed 51 users of various disc drive, tape drive, printer, terminal, and other peripheral products. This sample size is significantly larger than in 1987, when 34 peripheral users were surveyed. INPUT does not regularly survey peripheral users for its manufacturer-based user service requirement reports; therefore no comparisons with manufacturer-supplied service are possible.

The peripherals market has traditionally been a strong market for third-party maintenance vendors. Many peripheral product manufacturers did not have nationwide service organizations and, as a result, signed agreements with TPMs that allowed the TPM to be an exclusive or at least a preferred service provider. In addition, many peripheral manufacturers were successful at penetrating user sites that used systems from vendors such as IBM, DEC, HP, and other manufacturers that did not service foreign peripherals, thus creating a need for someone to step in and service the peripherals and, in some cases, the entire site.

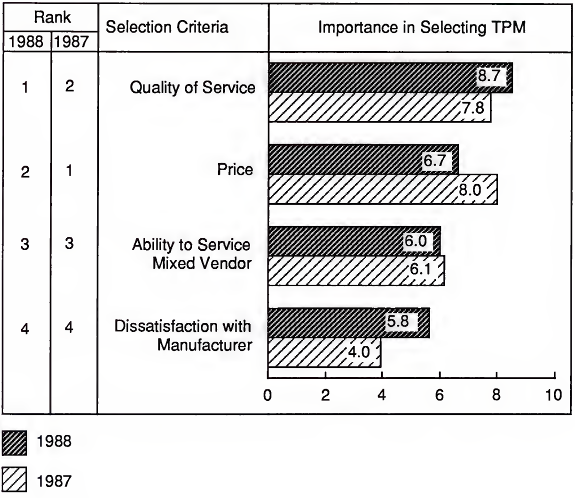
In the past, TPMs often priced peripherals extremely competitively, hoping to attract price-sensitive users to their service, with an immediate goal of getting a foot in the door and a long-term goal of assuming more and more of the service business at that site. Terminals were a low-(service)-cost item that was often used for this purpose.

Later, TPMs found that system manufacturers began to offer service on the "foreign" peripherals, thus making the peripheral market more competitive. IBM made peripheral service more difficult for TPMs by offering a three-year warranty on IBM's newest terminal line, the 3191—thus effectively removing that product line from TPMs' grasp. In fact, most manufacturers made efforts to win back peripheral service with attractive discount plans.

As a result, pricing became less important as a reason for selecting TPM service over the manufacturer's service. Exhibit VI-1 states that the 1988 peripheral sample placed greatest importance on the quality of service. This might be a reaction to some manufacturers' efforts to reduce peripheral service by requiring that users increase their involvement in the service process, either by performing diagnosis or by gathering "down" peripherals so they may be serviced at one time and at one location.

EXHIBIT VI-1

TPM SELECTION CRITERIA PERIPHERAL USERS



B

TPM Contractual Coverage—Peripheral Users

Exhibit VI-2 presents an analysis of the service coverage reported by the 1988 peripheral sample. In 1986 (the last year that INPUT analyzed peripheral user contractual coverage from TPM vendors), 93% of the respondents were covered Monday through Friday, and 82% were covered from 8 AM to 5 PM. The 1988 sample's coverage has not changed appreciably, even though system coverage has increased significantly.

EXHIBIT VI-2

TPM CONTRACT COVERAGE PERIPHERAL USERS

Service Coverage	Sample (Percent)
Days of Coverage	
Monday – Friday	88
Monday – Saturday	10
Monday – Sunday	2
Hours of Coverage	
1–9 Hours	84
10–16 Hours	6
17–24 Hours	10

Although it is true that most peripheral products are either functionally replaceable if a problem occurs (such as in the case of terminal), or are not as system critical as the CPU, there are times when either the timing of the problem (such as a printer problem at payroll time) or the application of the product (such as a disk drive that acts as a file server in a network) should warrant extended coverage.

C

TPM Vendor Performance Analysis—Peripheral Users

Exhibit VI-3 provides an analysis of peripheral system interruptions, both by frequency and by cause. Besides the fact that the peripheral sample reported a relatively high number of system interruptions (3.1) per month, the most striking information reported by users is the low percentage of problems caused by hardware, and the surprisingly high percentage of interruptions caused by systems and applications software.

EXHIBIT VI-3

TPM SYSTEM INTERRUPTION ANALYSIS
PERIPHERAL USERS

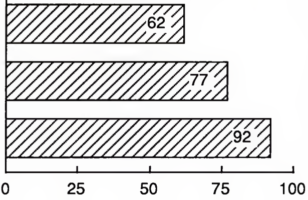
System Interruptions (per Month)	3.1
	Percent
Hardware Caused	49
System Software Caused	22
Applications Software Caused	6
Other (i.e., User Caused)	23

Given the high number of system interruptions that peripheral users of TPM reported, it follows that peripheral users would report the low system availability (96% received) shown in Exhibit VI-4. Still, TPM service vendors managed to satisfy 62% of the peripheral sample.

EXHIBIT VI-4

TPM SYSTEM AVAILABILITY ANALYSIS
PERIPHERAL USERS

Component	Require	Receive	Percent Satisfied
System Availability (Percent)	97.7	96.0	62
Response Time (Hrs)	6.6	7.9	77
Repair Time (Hrs)	5.3	5.6	92

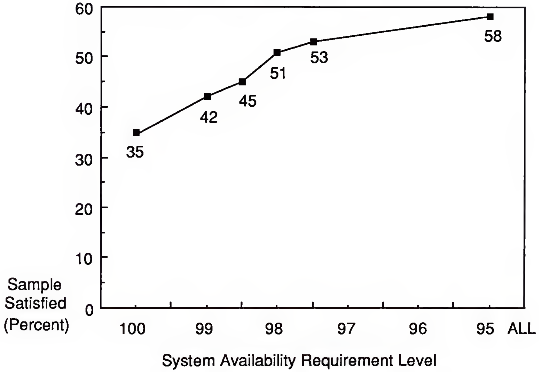


Contributing to the low system availability are response times that are considerably slower that user requirements (7.9 hours versus the users' requirement of 6.6 hours). This figure does represent an improvement over 1987's TPM sample of peripheral users, who reported response times that averaged 8.9 hours.

Exhibit VI-5 graphically shows that TPM performance in satisfying peripheral system availability requirements falls off at the 98% system availability requirement.

EXHIBIT VI-5

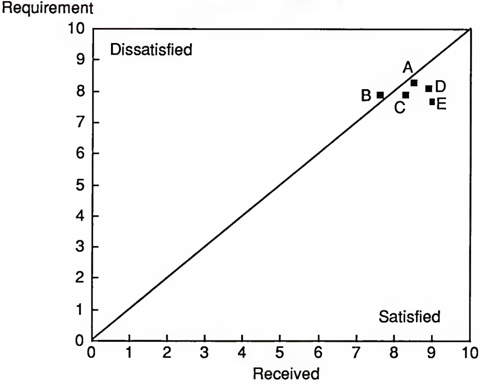
TPM SYSTEM AVAILABILITY SATISFACTION BY REQUIREMENT LEVEL PERIPHERAL USERS



Peripheral user concern with response times is reflected in relatively low satisfaction marks with TPM dispatching. Exhibits VI-6 and VI-7 indicate that TPM vendors satisfied only 56% of the peripheral respondents in this area. Furthermore, only 35% of users reported that they were satisfied with spare parts availability, suggesting that users have experienced delays in problem resolution caused by delays in getting the necessary spare part.

EXHIBIT VI-6

TPM HARDWARE MAINTENANCE REQUIRED VS. RECEIVED PERIPHERAL USERS



A. Hardware Engineer Skill
B. Hardware Phone Support Staff
C. Hardware Dispatch
D. Spare Parts Availability
E. Overall Hardware Maintenance

EXHIBIT VI-7

TPM HARDWARE MAINTENANCE SATISFACTION PERIPHERAL USERS

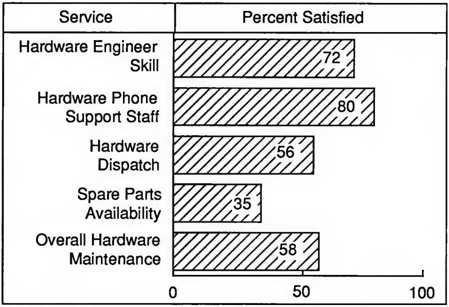
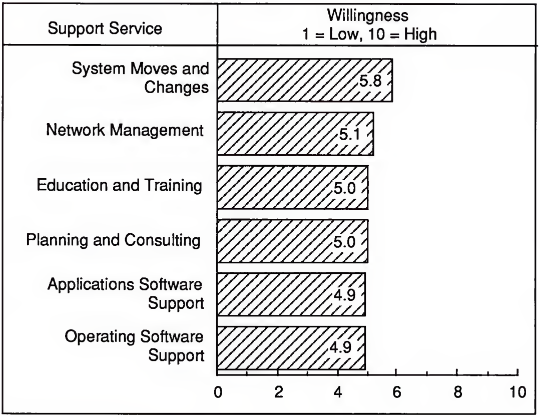


Exhibit VI-8 reflects a common theme among TPM users, a relative lack of interest in allowing their TPM vendor to expand service coverage to nonhardware maintenance service areas. Similar to the small-system users, peripheral users showed most interest in having their TPM perform system moves/changes, which are hardware-related anyway.

EXHIBIT VI-8

CURRENT TPM USER WILLINGNESS TO EXPAND COVERAGE PERIPHERAL USERS



Few of the peripheral users reported, as shown in Exhibit VI-9, that they received service discounts from their TPM, suggesting that TPM users have already negotiated the best price available already, and reinforcing the earlier finding that service quality is of greater importance than service price to today's peripheral users.

EXHIBIT VI-9

TPM USER EXPERIENCE WITH DISCOUNTS PERIPHERAL USERS

Discount	Sample (Percent)
Reduced Service Coverage	8
Scheduled Maintenance	0
Other	10

VII

TPM User Service Requirements—Microcomputers

VII

TPM User Service Requirements—Microcomputers

A

TPM Selection Criteria—Microcomputer Users

In 1988, INPUT surveyed 22 users of microcomputers who received their service and support from third-party maintenance vendors. This sample size, representing 11% of the total TPM user sample, was down slightly from 1987, when 34 micro users were surveyed.

In the early 1980s, sales of microcomputers exploded, creating a tremendous need for microcomputer support. Few manufacturers provided on-site support of microcomputers, preferring to rely on product distribution and third-party maintainers to provide service. Even IBM recognized the difficulty in supporting the rapidly growing but dispersed user base as a significant number of PC users relied on authorized retailers and TPMs to service the majority of their users.

As the microcomputer market began to mature, it soon became apparent that users would not value service and support as highly as would larger-system users. Microcomputers service prices plummeted to such a level that it became difficult to make sufficient margin on microcomputer service. As a result, most efforts to specialize solely on microcomputer service failed.

Presently, few service organizations view microcomputer support as a profitable endeavor on its own. Instead, most service organizations service micros at a larger-system user's site as a way of satisfying the total support needs of those users, or else as a way of penetrating a user's site in order to take over the service of larger, more-profitable product service at that site.

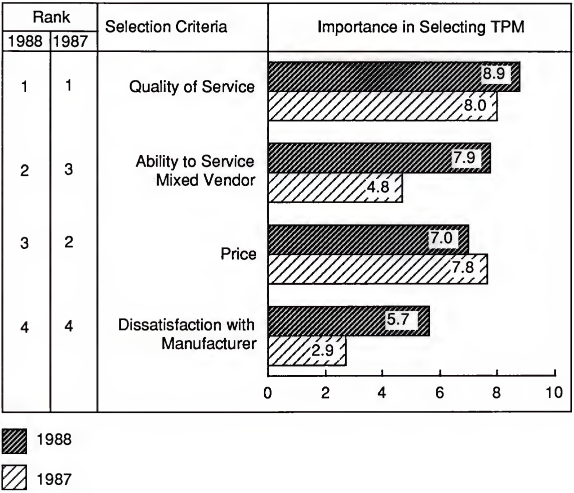
In 1987, IBM announced service pricing on its newest family of microcomputers, the PS/2 line. Where most service vendors priced their microcomputer service prices between 10% and 15% of the purchase price, IBM priced on-site support of its PS/2 microcomputers as low as

3% of the purchase price (on the PS/ Model 80). It soon became apparent that TPMs could not compete with IBM on a purely price basis, and instead focused on their long history of providing micro support (longer even than IBM), along with their ability to service multiple brands.

Exhibit VII-1 indicates that third-party users of microcomputers value service quality and mixed-vendor service capabilities higher than service price as factors in selecting a third-party maintenance provider.

EXHIBIT VII-1

TPM SELECTION CRITERIA
MICROCOMPUTER USERS



B

TPM Contractual Coverage—Microcomputer Users

The fact that many users of microcomputers also receive support on their larger systems is hinted at in Exhibit VII-2, which indicates that one-third of the microcomputer TPM user sample receives 24-hour, 7-day per week coverage on their systems, a much higher percentage than one might expect for standalone users of microcomputers. As a point of comparison, only 13% of the 1986 TPM sample of microcomputer users received around-the-clock coverage.

EXHIBIT VII-2

TPM CONTRACT COVERAGE MICROCOMPUTER USERS

Service Coverage	Sample (Percent)
Days of Coverage	
Monday – Friday	67
Monday – Saturday	0
Monday – Sunday	33
Hours of Coverage	
1–9 Hours	61
10–16 Hours	6
17–24 Hours	33

Service coverage on microcomputers is obviously good news to users, who find that they are receiving more coverage for lower prices. On the other hand, the increased coverage is bound to cut deeper into the service margins of service vendors, since microcomputers are not becoming significantly more reliable and are not benefitting from such service cost-cutting advances as remote support.

C

TPM Vendor Performance Analysis—Microcomputer Users

The 1988 TPM sample of microcomputer users reported, as shown in Exhibit VII-3, that their machines averaged 2.1 system interruptions per month, the majority (52%) of the problems being hardware-related. Still, a larger percentage of software-related problems (20% systems and 7% applications) were reported by the microcomputer user sample than were reported for other product groups, suggesting that some form of third-party software and educational support opportunity exists.

EXHIBIT VII-3

TPM SYSTEM INTERRUPTION ANALYSIS MICROCOMPUTER USERS

System Interruptions (per Month)	2.1
	Percent
Hardware Caused	52
System Software Caused	20
Applications Software Caused	7
Other (i.e., User Caused)	21

Exhibit VII-4 indicates that while users have lower system availability requirements than for other product types, TPM service vendors are less successful at satisfying users of microcomputers than users of other product types. In part, this is due to the unreasonably high expectations of a significant portion of the microcomputer sample (38% of the sample reported that they required 100% system availability). It would be unrealistic to expect anywhere near 100% system availability from products that averaged 2.1 system interruptions per month (although five users did report that they received 100% system availability). The fact that total turnaround time (response + repair time) on system problems approached 18 hours also contributed to lower-than-required system availability (last year's sample of microcomputer users of TPM reported total service time of just under 13 hours).

EXHIBIT VII-4

TPM SYSTEM AVAILABILITY ANALYSIS
MICROCOMPUTER USERS

Component	Require	Receive	Percent Satisfied
System Availability (Percent)	96.3	96.1	57
Response Time (Hrs)	6.5	6.4	75
Repair Time (Hrs)	14.4	11.4	94

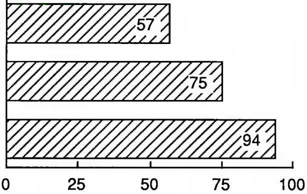
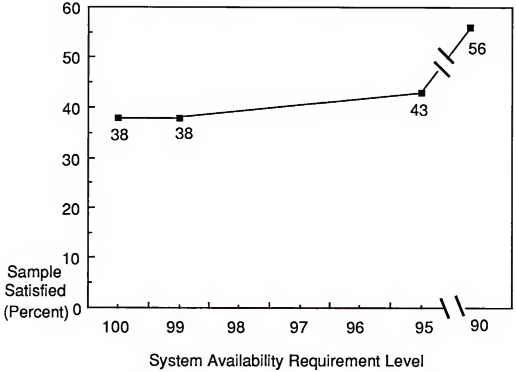


Exhibit VII-5 illustrates the wider range of system availability requirements expressed by the microcomputer sample (six users had system availability requirements of 90% or less). This disparity of user requirements actually makes it more difficult for service vendors to successfully satisfy the sample as a whole. Instead, it is much easier to identify and then meet users' base needs if their requirements are more consistent.

EXHIBIT VII-5

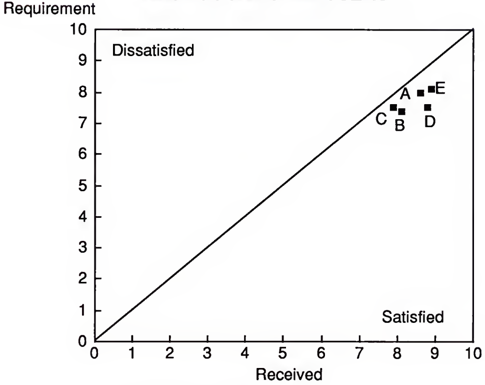
TPM SYSTEM AVAILABILITY SATISFACTION BY REQUIREMENT LEVEL MICROCOMPUTER USERS



Microcomputer users not only express lower requirements for system availability, but also express lower requirements for most areas of service and support. Exhibit VII-6 shows that the microcomputer users rated their requirements for all hardware maintenance areas, yet user satisfaction with these areas is still no higher than for any other group of TPM respondents. Exhibit VII-7 indicates that spare parts availability is a major concern, since TPM vendors were able to satisfy only 45% of the microcomputer users in this area. This problem may be made worse by increased usage of name-brand (e.g., Leading Edge) and "no-name" clones.

EXHIBIT VII-6

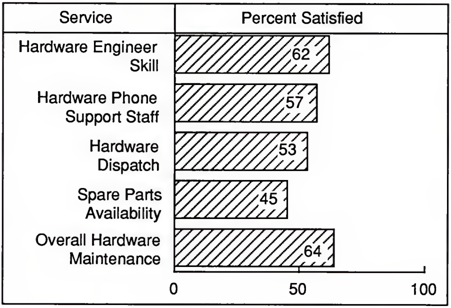
TPM HARDWARE MAINTENANCE REQUIRED VS. RECEIVED MICROCOMPUTER USERS



A. Hardware Engineer Skill
B. Hardware Phone Support Staff
C. Hardware Dispatch
D. Spare Parts Availability
E. Overall Hardware Maintenance

EXHIBIT VII-7

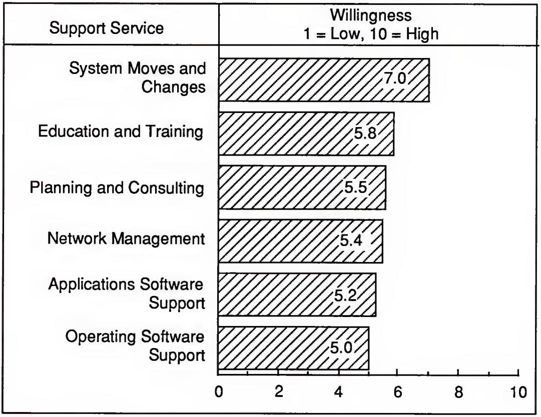
TPM HARDWARE MAINTENANCE SATISFACTION MICROCOMPUTER USERS



Microcomputer users appear to be moderately interested in having their TPM vendors perform system moves/changes, rating their willingness (in Exhibit VII-8) higher (a seven on a scale of ten) than any other group for any type of service. Since microcomputers are readily moveable, it is obvious that users were attracted to "change" services, particularly due to constant need for microcomputer upgrades.

EXHIBIT VII-8

CURRENT TPM USER WILLINGNESS TO EXPAND COVERAGE MICROCOMPUTER USERS



Eighteen percent of the microcomputer users reported that they received discounts for reduced service coverage, as shown in Exhibit VII-9. Most often, these discounts are offered to microcomputer users that either gather faulty microcomputers so that the service representative can perform service at a single location (rather than spend time locating faulty microcomputers throughout a user site) or to users that set up some level of "help desk," assuming responsibility for diagnosis and actual maintenance (usually in the form of board or component exchange).

EXHIBIT VII-9

TPM USER EXPERIENCE WITH DISCOUNTS MICROCOMPUTER USERS

Discount	Sample (Percent)
Reduced Service Coverage	18
Scheduled Maintenance	9
Other	9

A

Appendix: Questionnaire

A

Appendix: Questionnaire

A. Background

1 manufacturer/model: ______________________________

2 service vendor: ☐ a. TPM
☐ b. manufacturer
(go to systems questionnaire)

3 TPM vendor: ____________________________________

4 service coverage: ____ a. days
____ b. hours

B. Purchase Decision Criteria

5 Please rate on a scale of 1 to 10 (1 low, 10 high) the importance of the following criteria in choosing your TPM vendor:

	Importance (1-10)
a. dissatisfaction with manufacturer	____
b. price	____
c. quality of service	____
d. ability to service mixed-shop (multiple vendor systems)	____
e. other (specify)____________	____

C. Hardware Maintenance

6 a. How many system interruptions (on average) do you experience per month?
______/mo.

b. What percent of these are:

1. hardware related?	%HW	____
2. systems software related?	%sys SW	____
3. applications software related?	%app SW	____
4. other (user, power source, etc.)	%other	____

7 On average over the past year:

	a. require	b. received
1. system availability	_____.__%	_____.__%
2. response time	_____.__ hrs.	_____.__hrs.
3. repair time	_____.__ hrs.	_____.__hrs.

8 a. Please rate on a scale of 1 to 10 (1 low, 10 high) the importance of each of the following aspects of support.

b. Then, on the same scale, please rate your current level of satisfaction with the support you're receiving from your TPM vendor in that area.

	a. imptce	vs. (1-10)	b. sat.
1. HW engineer skill	_____		_____
2. HW phone-support staff	_____		_____
3. HW dispatch	_____		_____
4. spare parts availability	_____		_____
5. overall satisfaction with HW maintenance	_____		_____

9 a. Are you currently involved in the service of your system by performing any of the following tasks?

b. If no: On a scale of 1 to 10, how willing would you be to perform these tasks for a discount on your systems service contract?

c. If yes: Do you receive a discount currently? If no: What discount would you expect to receive?

	a. involved now? (y/n)	b. willing (1-10)	c. percent discount (%)
1. board swaps	_______	_______	_______
2. component replacement	_______	_______	_______
3. diagnosis	_______	_______	_______
4. depot (mail/carry-in)	_______	_______	_______
5. support mgmt/control ("help desk") functions	_______	_______	_______

D. Software Support

10 a. Are you currently receiving software support from your TPM vendor? (Yes/No)_____

b. If yes: About what percent of license fee do you pay for support? ____% (proceed to question 11)

c. If no: proceed to question 14.

11 Which of the following software services do you receive from your TPM vendor on a contract basis, and/or an ad-hoc basis? (check all that apply)

	a. contract	vs.	b. ad-hoc
1. on-site	☐		☐
2. telephone hotline	☐		☐
3. remote	☐		☐
4. problems data base	☐		☐

12 a. Please rate on a scale of 1 to 10 (1 low, 10 high) the importance of each of the following aspects of software support.

b. Then, on the same scale, please rate your current level of satisfaction with the support you're receiving from your TPM vendor.

	a. imptce	vs. (1-10)	b. sat.
1. on-site support	_____		_____
2. telephone hotline	_____		_____
3. remote support	_____		_____
4. problems data base	_____		_____
5. SW engineer skill	_____		_____
6. SW product reliability	_____		_____
7. software support overall	_____		_____

13 For the following questions, a "major software problem" can be defined as one in which processing cannot be continued, while a "minor software problem" allows processing to be performed with minor degradation. All questions refer to an average number of problems over the past 12 months.

a. average number of major problems reported ______
b. average number of major problems resolved ______
c. turnaround time of major problem resolution ____ hrs.

d. average number of minor problems reported ______
e. average number of minor problems resolved ______
f. turnaround time of minor problem resolution ____ hrs.

E. Telecommunications

14 a. Does your TPM vendor support any of your telecommunications equipment? (Yes/No)_____

b. If no:
How willing (on a scale of 1 to 10) would you be to include your telecomm equipment under your TPM contract, (assuming the service was available)? (1 low, 10 high) _____

c. If yes:
1. For what equipment? ______________________________

2. Please rate your satisfaction with the telecommunications support you receive from your TPM vendor in terms of :

	(1-10)
a. engineer skill level	_____
b. overall telecomm support	_____

F. Educational Services

15 a. Which of the following types of education or training services do you receive from your TPM vendor? (Qs 1.-3.)

If yes: b. Do you receive that training on-site?
c. At a training center?
d. Through interactive video?
e. As computer-based training?
(check all that apply)

	a. y/n	education/ training service	b. on-site	c. training center	d. inter-active video	e. computer-based training
1.		operational training				
2.		maintenance training				
3.		other				

16 Please rate your current level of satisfaction with the training/education support you're receiving from your TPM vendor.

	satisfaction (1-10)
1. subject matter	_____
2. amount of training	_____
3. training methods	_____

17 Are there areas in which you feel more courses should be offered? ______________

____

G. Professional Services

18 Have you received planning or consulting support from your TPM vendor? (Yes/No) _____

19 If no: proceed to question 22.
If yes:

a. Please rate the importance of planning and consulting services in each of the following areas (1-10).

b. Then rate your satisfaction with the service you've received from your TPM vendor in each area (1-10).

	a. imptce	vs. (1-10)	b. sat
planning:			
1. installation planning (environmental/site)	_____		_____
2. needs assessment planning	_____		_____
3. capacity planning	_____		_____
4. network design planning	_____		_____
5. overall planning services	_____		_____
consulting:			
6. site/facility management	_____		_____
7. network management	_____		_____
8. systems integration	_____		_____
9. disaster recovery	_____		_____
10. overall consulting services	_____		_____
other:			
11. installation/moves	_____		_____
12. changes/upgrades	_____		_____

20 Please rate on a scale of 1 to 10 (1 low, 10 high) your current level of satisfaction with the support you've received from your TPM vendor in each area of planning/consulting.

	satisfaction (1-10)
a. expertise of staff	_____
b. offerings suitable to needs	_____
c. results of plng/consulting	_____

21 In what areas do you foresee a need for planning/consulting in the future? _____

_____

H. Pricing

22 Please rate your level of satisfaction with the price of the following services you receive from your TPM vendor:

	(1-10)
a. hardware service	_____
b. software support	_____
c. education/training	_____
d. planning/consulting	_____

23 Do you receive a discount for any of the following reasons?

	(Yes/No)
a. reduced service coverage	_____
b. scheduled maintenance visits	_____
c. other (specify)_____________	_____

I. TPM Market Growth Potential

24 Please rate (1-10) your willingness to use TPM for:

	(1-10)
a. applications SW support	_____
b. operating SW support	_____
c. education and training	_____
d. planning and consulting	_____
e. network management	_____
f. system moves/changes/upgrades	_____

25 a. Do you plan to expand your use of TPM in the future? (Yes/No) ______

b. In which areas (e.g., a.-f. above) ______________________________________

____

26 Have you been approached by the manufacturer to return to their service? (Yes/No) ______

27 Which other TPMs have approached you in the last six months? ______________

____

THANK YOU!

B

Appendix: Definitions

B

Appendix: Definitions

Applications Software - Software that performs processing to service user functions.

Artificial Intelligence - The academic discipline involving the study of the processes by which humans perceive and assimilate data (and use reasoning to process this data) for the purpose of duplicating these processes within computer systems. Also, this term refers to the computer systems that accomplish these duplicated processes.

BOC - Bell Operating Company.

Consulting - Includes analysis of user requirements and the development of a specific action plan to meet user service and support needs.

Dispatching - The process of allocating service resources to solve a support-related problem.

Divestiture - The action, stemming from antitrust lawsuits by the Department of Justice, which led to the breakup of AT&T and its previously owned local operating companies.

Documentation - All manuals, newsletters, and text designed to serve as reference material for the ongoing operation or repair of hardware or software.

End User - May buy a system from the hardware supplier(s) and do own programming, interfacing, and installation. Alternatively, may buy a turnkey system from a systems house or hardware integrator.

Expert Systems Applications - Applications for expert systems—a computer system based on a data base created by human authorities on a particular subject. The computer system supporting this data base contains software that permits inferences based on inquiries against the

information contained in the data base. Expert systems is often used synonymously with "knowledge-based systems," although this latter term is considered to be broader and to include expert systems within its scope.

Engineering Change Notice (ECN) - Product changes to improve the product after it has been released to production.

Engineering Change Order (ECO) - The follow-up to ECNs that includes parts and a bill of material to effect the change in hardware.

Escalation - The process of increasing the level of support when and if the field engineer cannot correct a hardware or software problem within a prescribed amount of time, usually two to four hours for hardware.

Fiber Optics - A transmission medium which uses light waves.

Field Engineer (FE) - For the purpose of this study, field engineer, customer engineer, service person, and maintenance person were used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

Field Service Management System (FSMS) - A specialized application program that automates some (if not all) of the following activities of a field service organization: call handling, dispatching, parts inventory and tracking, billing, efficiency reporting, and other functions. Ideally, the system accesses one data base from which each function can use and modify data.

Hardware Integrator - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. May also develop control system software in addition to installing the entire system at the end-user site.

ISDN - Integrated Services Digital Network. A proposed standard for digital networks providing transport of voice, data, and image using a standard interface and twisted pair wiring.

LADT - Local Area Data Transport. Data communications provided by the BOCs within local access transport areas (LATA).

Large System - Refers to traditional mainframes including at the low end IBM 4300-like machines and at the high end IBM 308X-like machines. Large systems have a maximum word length of 32 bits and a standard configuration price of $350,000 and higher.

Mean Time Between Failures (MTBF) - The elapsed time between hardware failures on a device or a system.

Mean Time to Repair - The elapsed time from the arrival of the field engineer on the user's site until the device is repaired and returned to the user for his utilization.

Mean Time to Respond - The elapsed time between the user placement of a service call and the arrival at the user's location of a field engineer.

Microcomputer - A microprocessor-based single- or multi-user computer system typically priced less than $15,000. A typical configuration includes an 8- or 16-bit CPU, monitor, keyboard, two floppy disk drives, and all required cards and cables.

Minicomputer - See Small System.

Operating System Software (Systems Software) - Software that enables the computer system to perform basic functions. Systems Software, for the purposes of this report, does not include utilities or program development tools.

PBX - Private Branch Exchange. A customer premises telephone switch.

Peripherals - Includes all input, output, and storage devices, other than main memory, which are locally connected to the main processor and are not generally included in other categories, such as terminals.

Planning - Includes the development of procedures, distribution, organization, and configuration of support services. For example, capacity planning, "installation" planning.

Plug-Compatible Mainframe (PCM) - Mainframe computers that are compatible with and can execute programs on an equivalent IBM mainframe. The two major PCM vendors at this time are Amdahl and National Advanced Systems.

Professional Services - A category of services including system design, custom programming, consulting, education, and facilities management.

RBOC - Regional Bell Operating Company. One of seven holding companies coordinating the activities of the BOCs.

Remote Diagnostics - Gaining access to a computer from a point physically distant from the computer in order to perform problem determination activities.

Remote Support Implementation - An extension of remote diagnostics where some level of support delivery is performed from a point physically distant from the computer. Currently, this capability is more common to software support where problems can be solved or circumvented through downline loading of new code (fixes).

Reseller - A marketing organization which buys long-distance capacity for others at wholesale rates, selling services at retail but discounted prices and profiting on the difference.

Small Business Computer - For the purpose of this study, a system which is built around a Central Processing Unit (CPU), has the ability to utilize at least 20M bytes of disk capacity, provides multiple CRT workstations, and offers business-oriented systems software support.

Small System - Refers to traditional minicomputer and superminicomputer systems ranging from a small multi-user, 16-bit system at the low end to sophisticated 32-bit machine at the high end.

Software-Defined Network - A private network which uses public network facilities and which is configurable on an as-needed basis by the user (see Virtual Private Network).

Software Engineer (SE) - The individual who responds (either on-site or via remote support) to a user's service call to repair or patch operating systems and/or applications software.

Software Products - Systems and applications packages which are sold to computer users by equipment manufacturers, independent vendors, and others. Also included are fees for work performed by the vendor to implement a package at the user's site.

Superminicomputer - See Small System.

Systems Integration - The action of a single service vendor's design, development, and implementation of a system or subsystem including integration of hardware, software, and communications facilities for a customer.

System Interruption - Any system downtime requiring an Initial Program Load (IPL).

Systems House - Integrates hardware and software into a total turnkey system to satisfy the data processing requirement of the end user. May also develop systems software products for license to end users.

T-1 - Refers to a standard 1.544 megabit per second digital channel used between telephone company central offices and now used for microwave, satellite, fiber optics, or other bypass applications.

Third-Party Maintenance (TPM) - Any service provider other than the original equipment vendor.

Training - All audio, visual, and computer-based documentation, materials, and live instruction designed to educate users and support personnel in the ongoing operation or repair of hardware and software.

Turnkey System - Composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.

VSAT - Very Small Aperture Terminal. A small satellite dish system, usually using KU-band frequencies.

Virtual Private Network - A portion of a public network dedicated to a single user.